

a program for use by or in connection with an instruction execution system, apparatus, or device.

[0018] Program code embodied on a computer readable medium may be transmitted using any appropriate medium, including but not limited to wireless, wireline, optical fiber cable, RF, etc., or any suitable combination of the foregoing.

[0019] Computer program code for carrying out operations for aspects of the present invention may be written in any combination of one or more programming languages, including an object oriented programming language such as Java, Smalltalk, C++ or the like and conventional procedural programming languages, such as the “C” programming language or similar programming languages. The program code may execute entirely on the user’s computer, partly on the user’s computer, as a stand-alone software package, partly on the user’s computer and partly on a remote computer or entirely on the remote computer, server, or cluster of servers. In the latter scenario, the remote computer may be connected to the user’s computer through any type of network, including a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

[0020] Aspects of the present invention are described below with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

[0021] These computer program instructions may also be stored in a computer readable medium that can direct a computer, other programmable data processing apparatus, or other devices to function in a particular manner, such that the instructions stored in the computer readable medium produce an article of manufacture including instructions which implement the function/act specified in the flowchart and/or block diagram block or blocks.

[0022] The computer program instructions may also be loaded onto a computer, other programmable data processing apparatus, or other devices to cause a series of operational steps to be performed on the computer, other programmable apparatus or other devices to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide processes for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

[0023] FIG. 1 depicts a schematic diagram of one illustrative embodiment of a question/answer creation (QA) system 100 in a computer network 102. QA system 100 may include a knowledge manager computing device 104 (comprising one or more processors and one or more memories, and potentially any other computing device elements generally known in the art including buses, storage devices,

communication interfaces, and the like) that connects QA system 100 to the computer network 102. The network 102 may include multiple computing devices 104 in communication with each other and with other devices or components via one or more wired and/or wireless data communication links, where each communication link may comprise one or more of wires, routers, switches, transmitters, receivers, or the like. QA system 100 and network 102 may enable question/answer (QA) generation functionality for one or more content users. Other embodiments of QA system 100 may be used with components, systems, sub-systems, and/or devices other than those that are depicted herein.

[0024] QA system 100 may be configured to receive inputs from various sources. For example, QA system 100 may receive input from the network 102, a corpus of electronic documents 107 or other data, a content creator, content users, and other possible sources of input. In one embodiment, some or all of the inputs to QA system 100 may be routed through the network 102. The various computing devices on the network 102 may include access points for content creators and content users. Some of the computing devices may include devices for a database storing the corpus of data. The network 102 may include local network connections and remote connections in various embodiments, such that knowledge manager 100 may operate in environments of any size, including local and global, e.g., the Internet. Additionally, knowledge manager 100 serves as a front-end system that can make available a variety of knowledge extracted from or represented in documents, network-accessible sources and/or structured data sources. In this manner, some processes populate the knowledge manager with the knowledge manager also including input interfaces to receive knowledge requests and respond accordingly.

[0025] In one embodiment, the content creator creates content in electronic documents 107 for use as part of a corpus of data with QA system 100. Electronic documents 107 may include any file, text, article, or source of data for use in QA system 100. Content users may access QA system 100 via a network connection or an Internet connection to the network 102, and may input questions to QA system 100 that may be answered by the content in the corpus of data. As further described below, when a process evaluates a given section of a document for semantic content, the process can use a variety of conventions to query it from the knowledge manager. One convention is to send a well-formed question. Semantic content is content based on the relation between signifiers, such as words, phrases, signs, and symbols, and what they stand for, their denotation, or connotation. In other words, semantic content is content that interprets an expression, such as by using Natural Language (NL) Processing. Semantic data 108 is stored as part of the knowledge base 106. In one embodiment, the process sends well-formed questions (e.g., natural language questions, etc.) to the knowledge manager. QA system 100 may interpret the question and provide a response to the content user containing one or more answers to the question. In some embodiments, QA system 100 may provide a response to users in a ranked list of answers.

[0026] In some illustrative embodiments, QA system 100 may be the IBM Watson™ QA system available from International Business Machines Corporation of Armonk, N.Y., which is augmented with the mechanisms of the illustrative embodiments described hereafter. The IBM Wat-